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(71) Applicant: THE CLOROX COMPANY [US/US]; 1221 Broadway, Oakland, CA 94612 (US).

(72) Inventors: KILKENNY, Andrew; 2926 Liberty Drive, Pleasanton, CA 94566 (US). SHAHEEN, Elias, A.; 106 Treasure Court, San Ramon, CA 94583 (US). BLUM, Robert, L.; 2595 Morgan Territory, Clayton, CA 94512 (US). MITRA, Shumanta; 4637 Sandyford Court, Dublin, CA 94568 (US). DE LEO, Malcolm, A.; 2525 Grove Way, #2, Castro Valley, CA 94546 (US). NELSON, Shona, L.; 435 South Q Street, Livermore, CA 94550 (US).

(74) Agents: HAYASHIDA, Joel, J. et al.; The Clorox Company, 1221 Broadway, Oakland, CA 94612 (US).

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(54) Title: IMPROVED CLEANING COMPOSITION

(57) Abstract: An improved cleaning composition adapted to clean a variety of hard surfaces. The improved cleaning composition includes a cationic biocide that includes biguanide compounds and/or quats.

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IMPROVED CLEANING COMPOSITION

The present invention is a continuation-in-part of co-pending United States Patent Application Serial No. 09/939,383 filed August 24, 2001 entitled "Bactericidal Cleaning Wipe," and is incorporated herein by reference. The present invention is also a continuation-in-part of co-pending United States Patent Application Serial No. 09/939,179 filed August 24, 2001 entitled "Bactericidal Cleaning Wipe," which in turn is a continuation-in-part of co-pending United States Patent Application Serial No. 09/737,641 filed December 14, 2000 entitled "Bactericidal Cleaning Wipe." United States Patent Application Serial Nos. 09/939,179 filed August 24, 2001 and 09/737,641 filed December 14, 2000 are incorporated herein by reference.

The present invention relates to an improved cleaning composition that includes a cationic biocide. The cleaning composition can be used alone, in combination with one or more other cleaning compositions, and/or in combination towel, cloth, rag, sponge, mop, squeegee, and the like.

BACKGROUND OF THE INVENTION

Many types of cleaning compositions have been developed to clean various types of products and/or surfaces. Some of these cleaning compositions included one or more compounds to disinfect, sanitize, and/or sterilize the product and/or surface. Acids and alcohols have been traditionally added to cleaning solutions as the principal biocide of the cleaning solution. The present invention relates to an improved cleaning composition having that includes at least one cationic biocides such as, but not limited to, biguanide compounds and/or quaternary ammonium salts ("quats") as the anti-microbial active. The cleaning composition can include other traditional anti-microbial actives such as, but not limited to, one or more acids and/or alcohols. The cleaning composition is envisioned as being used in a wide variety of applications. As can be appreciated, the additives in the cleaning composition that are used in combination with the cationic biocide as the anti-microbial active may vary depending on the particular application of the cleaning composition.

Cleaning wipes are a relatively recent concept that has gained wide public acceptance, especially in the area of infant care products. Infant care wipes commonly include inverse emulsions (i.e. water-in-liquid). Cleaning wipes have also included waxes to polish and clean furniture and/or other metal, plastic and/or wood surfaces. Cleaning wipes have further included soaps and/or

Sticky surfaces typically indicate to the consumer that the surface has not been effectively cleaned. Cleaning formulations that tend to leave residues and/or cause streaking tend to produce a less shiny, thus a visually perceived less clean surface, and further tend to leave a sticky surface. This is especially true with mop and wet wipe applications, where such compositions are left to dry on the surface without rinsing. As a result, the consumer perceives that the cleaned surface has not be effectively cleaned irrespective of the fact the surface may have been properly cleaned and disinfected. Liquid cleaners having a high quat content are also subject to various local, state and/or federal regulations due to the toxicity of the quat in high concentrations.

Various types of biocides are also used to disinfect, sanitize, and/or sterilize tools and/or equipment. Such biocides are commonly used in the medical field. Biocides such as quats and biguanide compounds have typically not been used because of their cost. Typically alcohols are used as the disinfectant. However, the use of alcohol has come under more federal, state and local regulation, thus interest in the use of other biocides has gained interest in recent years.

Biocides are also used to disinfect, sanitize, and/or sterilize areas that have been exposed to infectious biological agents (e.g. anthrax, small pox). Presently, biocides such as quats and biguanide compounds have not been used for such applications.

In view of the present state of the art of cleaning compositions, there is a demand for an improved cleaning composition that can be used in a variety of applications to disinfect, sanitize, and/or sterilize surfaces without leaving undesired residues and/or streaking on the cleaned surface, without one or more components overly absorbing and/or adsorbing into the cleaned surface, and/or which cleaning composition is cost effective to use.

SUMMARY OF THE INVENTION

The present invention is related to an improved cleaning composition that includes a cationic biocide. The improved cleaning composition is generally a liquid cleaner; however, the improved cleaning composition may be in an aerosol, solid or semi-solid form. The improved cleaning composition can be used by itself or combined with other cleaning formulations. The improved cleaning composition can be loaded onto an absorbent and/or absorbent material, and/or can be used separately from an absorbent and/or absorbent material. The absorbent and/or absorbent material

etc.), medical and/or dental equipment, marine equipment (e.g., sail boats, power boats, rafts, sail board, canoe, row boats, etc.), toys, writing implements, watches, framed pictures or paintings; books, and/or the like. The improved cleaning composition can also be used in a variety of industrial and institutional applications. As used herein, the terms "industrial" and "institutional" shall mean the fields of use which include, but are not limited to, contract (e.g., professional) cleaning and disinfecting, retail facilities cleaning and disinfecting, industrial/manufacturing facilities cleaning and disinfecting, office cleaning and disinfecting services, hotel/restaurant/entertainment cleaning and disinfecting, health care (e.g., hospitals, urgent care facilities, clinics, nursing homes, medical/dental offices, laboratories) facilities cleaning and disinfecting, educational facilities cleaning and disinfecting, recreational (e.g., arenas, coliseums, resorts, halls, stadiums, cruise lines, arcades, convention centers, museums, theaters, clubs, family entertainment complexes (e.g., indoor and/or outdoor), marinas, parks) facilities cleaning and disinfecting, food service facilities cleaning and disinfecting, governmental facilities cleaning and disinfecting, public transportation facilities (e.g., airports, airlines, cabs, buses, trains, subways, boats, ports, and their associated properties) cleaning and disinfecting. The improved cleaning composition can be in concentrated form or unconcentrated form (e.g., ready to use form). When the improved cleaning composition is not first impregnated on an absorbent or adsorbent material, the improved cleaning composition can be dispensed and/or sprayed as liquid from a container, as an aerosol from an aerosol container, or as a crystal, powder, paste, or otherwise semi-solid or solid form from a container. The improved cleaning composition can be used as a disinfectant, sanitizer, and/or sterilizer. As used herein, the term "disinfect" shall mean the elimination of many or all pathogenic microorganisms on surfaces with the exception of bacterial endospores. As used herein, the term "sanitize" shall mean the reduction of contaminants in the inanimate environment to levels considered safe according to public health ordinance, or that reduces the bacterial population by significant numbers where public health requirements have not been established. An at least 99% reduction in bacterial population within a 24 hour time period is deemed "significant." As used herein, the term "sterilize" shall mean the substantially complete elimination or destruction of all forms of microbial life and which is authorized under the applicable regulatory laws to make legal claims as a "Sterilant" or to have

cleaning device. In one aspect of this embodiment, the cleaning pad has an absorbent capacity, when measured under a confining pressure of about 0.09 psi after about 20 minutes, of at least about 1g deionized water per gram of the cleaning pad, typically at least about 5g deionized water per gram of the cleaning pad, and more typically at least about 10 g deionized water per gram of the cleaning pad. In another and/or alternative aspect of this embodiment, the cleaning pad can have a total fluid capacity (of deionized water) of at least about 100g; however, pads having a total fluid capacity of less than about 100g are within the scope of the invention even though such cleaning pads are typically not as well suited for cleaning large areas. In still another and/or alternative aspect of this embodiment, there can be an absorbent layer on and/or in the cleaning pad which serves to retain fluid and soil absorbed by the cleaning pad during use. The absorbent layer typically includes at least one layer, and typically comprises multiple layers which are designed to provide the cleaning pad with multiple planar surfaces. In still yet another and/or alternative embodiment, cleaning wipe or cleaning pad can include a superabsorbent material. As used herein, the term "superabsorbent material" means any absorbent material having a g/g capacity for water of at least about 15 g/g, when measured under a confining pressure of about 0.3 psi. Representative superabsorbent materials include, but are not limited to, water insoluble, water- swellable superabsorbent gelling polymers. The superabsorbent gelling polymers useful in the present invention can have a size, shape and/or morphology varying over a wide range. These polymers can be in the form of particles that do not have a large ratio of greatest dimension to smallest dimension (e.g., granules, flakes, pulverulents, inter-particle aggregates, interparticle crosslinked aggregates, and the like), and/or the polymers can be in the form of fibers, sheets, films, foams, laminates, and the like. The use of superabsorbent gelling polymers in fibrous form provides the benefit of providing enhanced retention of the superabsorbent material, relative to particles, during the cleaning process. Superabsorbent gelling polymers useful in the present invention include, but are not limited to, a variety of water- insoluble, but water-swellable polymers capable of absorbing large quantities of fluids. Such polymeric materials are also commonly referred to as "hydrocolloids", and can include, but are not limited to, polysaccharides such as carboxymethyl starch, carboxymethyl cellulose, and/or hydroxypropyl cellulose; nonionic types such as polyvinyl alcohol, and/or polyvinyl ethers; cationic types such as

means can also and/or alternatively include the stiffening of the fibers by altering the chemical structure (e.g., crosslinking polymer chains). In one aspect of this embodiment, where the fibers are at least partially used as the absorbent and/or adsorbent layer (or a constituent component thereof), the fibers can be combined with a thermoplastic material. Upon melting, at least a portion of this thermoplastic material can migrate to the intersections of the fibers, typically due to interfiber capillary gradients. These intersections can become bond sites for the thermoplastic material. When cooled, the thermoplastic materials at these intersections solidify to form the bond sites that can hold the matrix and/or web of fibers together in each of the respective layers. This can be beneficial in providing additional overall integrity to the cleaning pad or cleaning wipe. Thermoplastic materials useful in the present invention can be in any of a variety of forms including, but are not limited to, particulates and/or fibers. Suitable thermoplastic materials can be made from any then-noplastic polymer that can be melted at temperatures that will not extensively damage the fibers that comprise the primary web or matrix of each layer. Generally, the melting point of the thermoplastic material will be less than about 190°C, and typically between about 75°C and about 175°C; however, other temperature ranges can be used. In any event, the melting point of the thermoplastic material should be no lower than the temperature at which the thermally bonded absorbent structures, when used in the cleaning pads or cleaning wipes, are likely to be stored. In still a further and/or alternative embodiment of the present invention, the cleaning wipes and/or pads can have an attachment layer that allows the wipe and/or pad to be connected to an implement's handle or the support head of various implements. The attachment layer is used in those embodiments where the absorbent and/or adsorbent layer is not suitable for attaching the wipe and/or pad to the support head of the handle. The attachment layer can also function as a mechanism to inhibit or prevent fluid flow through the top surface (e.g., the handle-contacting surface) of the cleaning wipe and/or pad, and/or can provide enhanced integrity of the wipe and/or pad. In one aspect of this embodiment, the attachment layer can consist of a mono-layer or a multi-layer structure. In another and/or alternative aspect of this embodiment, the attachment layer can comprise a surface which is capable of being mechanically attached to the handle's support head by use of a hook and loop system. In one specific design, the attachment layer can comprise at least one surface which is mechanically attachable to hooks that

of about 25-250 Newton/m. In another and/or alternative aspect of this embodiment, the cleaning wipe or pad has a wet tensile strength of about 75-170 Newton/m. Manufacturers of cleaning wipes that can be used in the present invention include, but are not limited to, Kimberly-Clark, E.I. Du Pont de Nemours and Company, Dexter, American Nonwovens, James River, BBA Nonwoven, and PGI. Specific, nonlimiting examples of cleaning wipes from these manufacturers are disclosed in Bouchette et al., United States Patent Nos. 4,781,974 and 4,615,937; Clark et al, United States Patent No. 4,666,621; Amundson et al., WO 98/03713; Cabell et al., United States Patent No. 5,908,707; Mackey et al., WO 97/40814; Mackey et al., WO 96/14835; and Moore, EP 750063, all of which are incorporated herein by reference.

In another and/or alternative aspect of the present invention, the cleaning wipe or pad can be individually sealed with a heat-sealable and/or glueable thermoplastic overwrap such as, but not limited to, polyethylene, Mylar and the like. In one embodiment, the cleaning wipes or pads are packaged as numerous, individual sheets or pads which are at least partially, impregnated with the improved cleaning composition of the present invention. In another and/or alternative embodiment, the cleaning wipes are at least partially formed as a continuous web during the manufacturing process and loaded into a dispenser such as, but not limited to, a canister with a closure or a tub with closure. The closure is at least partially used to seal the loaded cleaning wipes from the external environment and/or prevent premature volatilization of the components of the improved cleaning composition. In one aspect of this embodiment, the dispenser includes a plastic such as, but not limited to, high density polyethylene, polypropylene, polycarbonate, polyethylene pterethalate (PET), polyvinyl chloride (PVC), and/or other rigid plastic. In another aspect and/or alternative of this embodiment, the continuous web of cleaning wipes is at least partially threaded through an opening in the top of the dispenser. In still another and/or alternative aspect of this embodiment, the dispenser includes a severing arrangement to cut at least a portion of the cleaning wipe after being at least partially removed from the dispenser. The severing arrangement can include, but is not limited to, a knife blade, serrated edge, and/or the like. In still yet another and/or alternative aspect of this embodiment, the continuous web of cleaning wipes can be scored, folded, segmented, and/or partially cut into uniform and/or non-uniform sizes, and/or lengths. In a further and/or alternative

cellulose, synthetic, etc.), paper towels, napkins, cleaning pads, cloths, towels, rags, mop heads, and/or the like. In such applications, the improved cleaning composition is not preloaded or fully preloaded onto an absorbent and/or adsorbent material, thus the cleaning composition is at least partially applied by the user just prior to and/or during the cleaning process. When the improved cleaning composition is used in such application, the improved cleaning composition is typically packaged in a separate container or receptacle from the absorbent and/or adsorbent material. During the cleaning process, the improved cleaning composition is applied to the absorbent and/or adsorbent material. Additionally or alternatively, the cleaning composition can be applied to the surface to be cleaned and the absorbent and/or adsorbent material is used to pickup cleaning composition off the surface to be cleaned and/or spread the cleaning composition on the surface to be cleaned. The improved cleaning composition can be applied automatically and/or manually applied to the absorbent and/or adsorbent material and/or onto the surface to be cleaned.

In still another and/or alternative aspect of the present invention, the improved cleaning composition can be applied to a surface to be cleaned prior to exposing the improved cleaning composition to an absorbent and/or adsorbent material. The absorbent and/or adsorbent material can include cleaning wipes, sponges (e.g., cellulose, synthetic, etc.), paper towels, napkins, cleaning pads, cloths, towels, rags, mop heads, and/or the like. In such applications, the improved cleaning composition is not preloaded onto an absorbent and/or adsorbent material, but applied by the user to a surface to be cleaned and then wiped up by the absorbent and/or adsorbent material. The improved cleaning composition can be applied automatically and/or manually applied to the surface to be cleaned.

In still yet another and/or alternative aspect of the present invention, the improved cleaning composition can be applied and/or added to a surface and/or environment to be cleaned without ever applying the cleaning composition to an absorbent and/or adsorbent material. Examples of such uses of the improved cleaning composition include, but are not limited to, air fresheners, shampoos, hand lotions/cleaners, cleaners for cleaning internal components of machinery and/or process lines, carpet fresheners, carpet cleaners, cat litter, drain cleaners, toilet cleaners, environment cleaners (e.g., fumigation gas and/or fluid, liquid spray, etc.), and/or the like.

and Y_2 can be the same or different. M is an number equal to or greater than 1. Typically, M has an average value such that the molecular weight biguanide compounds is about 1000-1400; however, the molecular can be higher or lower. Generally M is about 2-20. Z_1 and Z_2 are either a hydrogen or a salt. Z_1 and Z_2 can be the same of different. In another and/or alternative aspect of this embodiment, the above-mentioned organic materials can be modified to include a thiol group in their structure so as to allow for the bonding of the compound to a metallic substrate, and/or may be derivatized with other functional groups to permit direct immobilization on a non-metallic substrate. In still another and/or alternative aspect of this embodiment, the above-mentioned organic materials may also be suitably functionalized to incorporate groups such as, but not limited to, hydroxy, amine, halogen, epoxy, alkyl and/or alkoxy silyl functionalities to enable direct immobilization to a surface. In yet another and/or alternative aspect of this embodiment, the salt can include, but is not limited to, salts with an inorganic acid such as, but not limited to, hydrochloride, hydrofluoride, nitrate, sulfate and/or phosphate, and/or salts with an organic acid such as, but not limited to, carboxylic acid, acetate, benzoate, tartrate, adipate, lactate, formate, maleate, glutamate, ascorbate, citrate, gluconate, oxalate, succinate, pamoate, salicylate, isethionate, succinamate, mono-diglycollate, dimethanesulfonate, di-isobutyrate, and/or glucoheptonate. Specific examples of these compounds include, but are not limited to, polyhexamethylene biguanide hydrochloride, p-chlorophenyl biguanide; and 4-chlorobenzhydryl biguanide. In still yet another and/or alternative aspect of this embodiment, the biguanide compound includes, but is not limited to, halogenated hexidine such as, but not limited to, chlorhexidine (1,1'-hexamethylene-bis-5-(4-chlorophenyl biguanide) and its salts. The salts include, but are not limited to, salts with an inorganic acid, such as hydrochloride, hydrofluoride, nitrate, sulfate and/or phosphate, and/or salts with an organic acid such as, but not limited to, carboxylic acid, acetate, benzoate, tartrate, adipate, lactate, formate, maleate, glutamate, ascorbate, citrate, gluconate, oxalate, succinate, pamoate, salicylate, isethionate, succinamate, mono-diglycollate, dimethanesulfonate, di-isobutyrate, and/or glucoheptonate. Examples of salts of chlorhexidine include, but are not limited to, chlorhexidine diphosphanilate, chlorhexidine digluconate, chlorhexidine diacetate, chlorhexidine dihydrochloride, chlorhexidine dichloride, chlorhexidine gluconate, chlorhexidine dihydroiodide, chlorhexidine diperchlorate, chlorhexidine

cost since the biguanide compound is typically one of the higher costing component of the improved cleaning composition. In addition, a biguanide compound content exceeding about 5 weight percent may be subject to strict local, state and/or federal regulations due to the toxicity of the improved cleaning composition. However, absent the cost and regulatory barriers, the biguanide compound content can exceed about 5 weight percent when the improved cleaning composition is used in applications which require a high biguanide compound content. In this respect, the biguanide compound content can be up to or exceed about 20 weight percent of the cleaning composition. The concentration of the biguanide compound in the improved cleaning composition may also exceed about 5 weight percent when the improved cleaning composition is in a concentrated form, thus intended to be diluted prior to use. In one aspect of this embodiment, the biguanide compound content of the improved cleaning composition is about 0.05-5 weight percent. In another aspect of this embodiment, the biguanide compound content of the improved cleaning composition is about 0.08-5 weight percent. In still another aspect of this embodiment, the biguanide compound content of the improved cleaning composition is about 0.1-2 weight percent. In yet another aspect of this embodiment, the biguanide compound content of the improved cleaning composition is about 0.1-1 weight percent. In still yet another aspect of this embodiment, the biguanide compound content of the improved cleaning composition is about 0.15-0.8 weight percent. In a further aspect of this embodiment, the biguanide compound content of the improved cleaning composition is about 0.175-0.6 weight percent. In yet a further aspect of this embodiment, the biguanide compound content of the improved cleaning composition is about 0.2-0.5 weight percent. In still a further aspect of this embodiment, the biguanide compound content of the improved cleaning composition is about 0.25-0.4 weight percent.

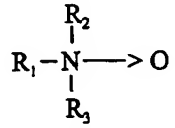
In yet another and/or alternative aspect of the present invention, the improved cleaning composition includes a cationic biocide that includes one or more quats. The cationic biocide in the improved cleaning composition can primarily include one or more quats, and/or include one or more other cationic biocides in combination with the one or more quats. Such other cationic biocides include, but are not limited to, biguanide compounds. Similar to biguanide compounds, quats are also capable of imparting a broad spectrum antimicrobial or germicidal properties to the improved

dimethyl ammonium chloride, dinonyly ethyl ammonium chloride, dimethyl ethyl benzyl ammonium chloride, 3-(trimethyxyosilyl) propyldidecylmethyl ammonium chloride, 3-(trimethoxysilyl) propyloctadecycdimethyl ammonium chloride, dimethyl dioctyl ammonium chloride, didecyl dimethyl ammonium chloride, didodecyl dimethyl ammonium chloride, dimethyl ditetradecyl ammonium chloride, dihexadecyl dimethyl ammonium chloride, dimethyl dioctadecyl ammonium chloride, decyl dimethyl octyl ammonium chloride, dimethyl dodecyloctyl ammonium chloride, benzyl decyl dimethyl ammonium chloride, benzyl dimethyl dodecyl ammonium chloride, benzyl dimethyl tetradecyl ammonium chloride, decyl dimethyl (ethyl benzyl) ammonium chloride, decyl dimethyl (dimethyl benzyl)-ammonium chloride, (chlorobenzyl)-decyl dimethyl ammonium chloride, decyl-(dichlorobenzyl)-dimethyl ammonium chloride, benzyl didecyl methyl ammonium chloride, benzyl didocyl methyl ammonium chloride, benzyl ditetradecyl methyl ammonium chloride, benzyl dodecyl ethyl methyl ammonium chloride, and/or the like. Some examples of commercially available quats that can be included in the improved cleaning composition include, but are not limited to, didecyl dimethyl ammonium chloride, available as BTC 1010 from Stepan Chemical Co.; di(C6- C14)alkyl di(C1-4 alkyl and/or hydroxyalkl) quaternary ammonium compounds such as BARDAC 2250 from Lonza, Inc.; FMB 210-15 from Huntington; Maquat 4450-E from Mason; dialkyl dimethyl ammonium chloride available as BTC 818 from Lonza, Inc.; FMB 302 and Maquat 40 from Mason; alkyl dimethyl benzyl ammonium chloride available as BTC 835 and BARQUAT MB-50 from Lonza, Inc.; FMB 451-5 and MC 1412 from Mason, alkyldimethylbenzyl ammonium chlorides such as the commercially available Barquat MB-50 from Lonza; N-(3-chloroallyl) hexaminium chlorides such as Dowicide and Dowicil available from Dow; benzethonium chloride such as Hyamine from Rohm & Haas; methylbenzethonium chloride represented by Hyamine IOX supplied by Rohm & Haas; and/or cetylpyridinium chloride such as Cepacol chloride available from of Merrell Labs. Examples of dialkyl quaternary compounds are di(C8-C12)dialkyl dimethyl ammonium chloride such as didecyldimethylammonium chloride, and dioctyldimethylammonium chloride (BARDAC 2050). Other cationic antimicrobial actives that can be used in the improved cleaning compositon include, but are not limited to, diisobutylphenoxyethoxyethyl dimethylbenzyl ammonium chloride, commercially available as Hyamine 1622 from Lonza. Some quats are sold

In another aspect of this embodiment, the quat content of the improved cleaning composition is about 0.08-5 weight percent. In still another aspect of this embodiment, the quat content of the improved cleaning composition is about 0.1-2 weight percent. In yet another aspect of this embodiment, the quat content of the improved cleaning composition is about 0.1-1 weight percent. In still yet another aspect of this embodiment, the quat content of the improved cleaning composition is about 0.15-0.8 weight percent. In a further aspect of this embodiment, the quat content of the improved cleaning composition is about 0.175-0.6 weight percent. In yet a further aspect of this embodiment, the quat content of the improved cleaning composition is about 0.2-0.5 weight percent. In still a further aspect of this embodiment, the quat content of the improved cleaning composition is about 0.25-0.4 weight percent. In still another embodiment, when one or more quats are combined with one or more biguanide compounds to function as the primary biocide in the improved cleaning composition, the quat content is about 0.001 - 5 weight percent of the improved cleaning composition and the biguanide compound content is also about 0.001 - 5 weight percent of the improved cleaning composition. The specific quantities of the quat and biguanide compounds in the improved cleaning composition is typically a function of economic cost considerations; local, state and/or federal regulatory restrictions; formula solubility requirements; streaking and residue properties of the improved cleaning composition; skin irritation considerations; and/or the intended use of the improved cleaning composition. In one specific aspect of this embodiment, the biguanide compound content is greater than the quat content in the improved cleaning composition. In another specific aspect of this embodiment, the biguanide compound content is less than the quat content in the improved cleaning composition. In yet anther specific aspect of this embodiment, the biguanide compound content is about equal to the quat content in the improved cleaning composition.

In yet another and/or alternative aspect of the present invention, the improved cleaning composition includes and/or is used in combination with one or more additional biocides used in combination with the biguanide compound and/or quat. Such biocides can include, but are not limited to, alcohols, peroxides, boric acid and borates, chlorinated hydrocarbons, organometallics, halogen-releasing compounds, mercury compounds, metallic salts, pine oil, organic sulfur compounds, iodine compounds, silver nitrate, quaternary phosphate compounds, and/or phenolics.

and/or alternative aspect of this embodiment, the surfactant includes an amine oxide. In still another and/or alternative aspect of this embodiment, the surfactant includes an amine oxide having the general formula:



wherein R_1 is a C_{6-30} alkyl, and R_2 and R_3 are C_{1-6} alkyl or hydroxyalkyl. R_2 and R_3 can be the same of different. These amine oxides can be ethoxylated and/or propoxylated. One specific amine oxide includes, but is not limited to, alkyl di (hydroxy lower alkyl) amine oxides, alkylamidopropyl di (lower alkyl) amine oxides, alkyl di (lower alkyl) amine oxides, and/or alkylmorpholine oxides, wherein the alkyl group has 5-25 carbons and can be branched, unbranched, saturated, and/or unsaturated. Nonlimiting examples of amine oxides include, but are not limited to, lauryl amine oxide sold under the name Barlox 12 from Lonza. In yet another and/or alternative aspect of this embodiment, the surfactant includes alkyl polyglycosides. The alkyl polyglycosides in the improved cleaning composition at least partially functions as a cleaning surfactant. The alkyl polyglycosides has also been found to reduce the filming and/or streaking of the improved cleaning composition on a variety of surfaces. The alkyl polyglycosides is typically formed by reacting a sugar with a higher alcohol in the presence of an acid catalyst, or by reacting a sugar with a lower alcohol (e.g., methanol, ethanol, propanol, butanol, etc.) to thereby provide a lower alkyl glycoside, which is then reacted with a higher alcohol. The higher alcohol generally has the formulation $R_1O(R_2O)_XH$; wherein R_1 represents a straight or branched alkyl, alkenyl, or alkylphenyl group having from 2 to 30 carbon atoms; R_2 represents an alkylene group having from 2 to 20 carbon atoms; and X is a mean value that is 0 to 10. Specific nonlimiting examples of the higher alcohol having a straight or branched alkanol include, but are not limited to, hexanol, heptanol, octanol, nonanol, decanol, dodecanol, tridecanol, tetradecanol, pentadecanol, hexadecanol, heptadecanol, octadecanol, methylpentanol, methylhexanol, methylheptanol, methyloctanol, methyldecanol, methylundecanol, methyltridecanol, methylheptadecanol, ethylhexanol, ethyloctanol, ethyldecanol, ethyldodecanol, 2-heptanol, 2-nonanol, 2-undecanol, 2-tridecanol, 2-pentadecanol, 2-heptadecanol, 2-butyloctanol,

typically less than about 30 dyne/cm, more typically less than about 25 dyne/cm, and even more typically about 15-22 dyne/cm. In another and/or alternative aspect of this embodiment, the fluorosurfactant in the improved cleaning composition reduces the amount of filming and/or streaking of the improved cleaning composition. The reduced the amount of filming and/or streaking occurs with or without buffing of the cleaned surface. In still another and/or alternative aspect of this embodiment, the fluorosurfactant includes an ethoxylated nonionic fluorosurfactant. Typically, the surfactant is partially or fully soluble in water. One type of non-limiting ethoxylated nonionic fluorosurfactant that can be used is Zonyl surfactants by DuPont and/or Fluorads from 3M. In still yet another and/or alternative aspect of this embodiment, the fluorosurfactant is used in combination with a buffer to enhance the reduction of filming and/or streaking of the improved cleaning composition. Non-limiting examples of buffers that can be used in combination with the fluorosurfactant include MEA, NH_4HCO_3, NH_4OH, NH_4Carbamate, and/or SLS. In yet another and/or alternative embodiment, the surfactant, when included in and/or used in combination with the improved cleaning composition, is present in an amount of at least about 0.001 weight percent of the improved cleaning composition. The amount of surfactant present in and/or used in combination with the improved cleaning composition is at least partially controlled to reduce the raw material cost of the improved cleaning composition and/or to restrict the dissolved actives which can contribute to residues remaining when the improved cleaning composition is applied to a surface. In one aspect of this embodiment, the surfactant content in and/or used in combination with the improved cleaning composition is about 0.01 - 10 weight percent. The concentration of the surfactant in and/or used in combination with the improved cleaning composition may exceed 10 weight percent when the improved cleaning composition is in a concentrated form. In another aspect of this embodiment, the surfactant content in and/or used in combination with the improved cleaning composition is about 0.01 - 5 weight percent. In still another aspect of this embodiment, the surfactant content in and/or used in combination with the improved cleaning composition is about 0.05 - 5 weight percent. In yet another aspect of this embodiment, the surfactant content in and/or used in combination with the improved cleaning composition is about 0.075 - 5 weight percent. In still yet another aspect of this embodiment, the surfactant content in and/or used in combination with the improved cleaning

combined at a later time with at least a portion of the improved cleaning composition. It has been found that a significant amount of cationic biocide such as, but not limited to, biguanide compounds and quats, are retained on an absorbent and/or adsorbent material during use of the absorbent and/or adsorbent material during cleaning. For instance, over about 60 percent of the biguanide compounds content in a cleaning composition and over about 50 percent of the quat content is typically retained on a cleaning wipe after use of the cleaning wipe. Similar retain levels of the cationic biocides occur on various other absorbent and adsorbent materials. As a result, the cationic biocide content of the prior cleaning solutions was typically increased to compensate for this high retention phenomena. Consequently, the cationic biocide content was typically at least doubled in prior cleaning solutions to ensure that the desired amount of cationic biocide was released from the cleaning wipe. In addition, when a cationic biocide containing cleaning solution was used in conjunction with sponges (e.g., cellulose, synthetic, etc.), paper towels, napkins, cloths, towels, rags, mop heads, and the like, the cationic biocide was also attracted to and retained by the sponges (e.g., cellulose, synthetic, etc.), paper towels, napkins, cloths, towels, rags, mop heads, and the like, thus removing the cationic biocide from the surface to be cleaned thereby reducing the effectiveness of prior cleaning solutions. It has been found that one source of this retention is at least partially related to the cationic properties of the cationic biocide and the anionic properties of the absorbent and/or adsorbent material. Absorbent and/or adsorbent materials such as, but not limited to, cleaning wipes, sponges (e.g., cellulose, synthetic, etc.), paper towels, napkins, cloths, towels, rags, mop heads, and/or the like that include wood pulp, a blend of wood pulp and/or synthetic fibers that are at least partially derived from wood pulp, include several anionic species such as carboxylate groups, ester groups and/or the like. These anionic species tend to bond to the cationic biocide thereby resulting in the cationic biocide being at least partially retained on the cleaning wipe, sponges (e.g., cellulose, synthetic, etc.), paper towels, napkins, cloths, towels, rags, mop heads, and the like. The biocide release agent is at least partially formulated to mitigate or prevent this bonding phenomena thereby enabling the improved cleaning composition to include a lower cationic biocide content without adversely affecting the cleaning properties and/or the disinfecting, sanitizing, and/or sterilizing efficacy of the improved cleaning composition when used in combination with an absorbent and/or

resulting in substantially irreversible bonding of the biocide release agent with the anionic species sites on the absorbent and/or adsorbent material. In yet another and/or alternative embodiment, one or more biocide release agents include a cationic salt. Salts are desirable biocide release agents in that such compounds are generally inexpensive when compared to many types of cationic biocides. A variety of different salts can be used such as, but not limited to, monovalent salts, divalent salts, organic salts, and the like. These salts include, but are not limited to, acetates, acetylides, ammonium salts (excluding quats), arsenates, astatides, azides, bihalide salts, bicarbonates, bisulfides, borides, borohydrides, borohalides, carconates, citrates, cyanates, cyanides, formates, germanates, glycinates, halates, halides, hydrides, hydroselenides, hydrosulphides, hydroxides, imides, metaniobates, metaantalates, metavanadates, nitrates, nitrides, nitrites, oxides, perchlorates, phosphates, phosphonium salts, selenides, selenites, selenates, sulphides, sulphates, ternary salts, tetraalkyl ammonium salts, tellurides, thiocyanates, and/or vanadates. In one aspect of this embodiment, the biocide release agent includes, but is not limited to, potassium citrate, sodium citrate, sodium tartrate, potassium tartrate, potassium lactate, sodium lactate, salicylate salts of sodium and/or potassium, magnesium sulphate, sodium chloride, ammonium chloride, and/or potassium chloride. In still yet another and/or alternative embodiment, a sufficient amount of biocide release agent is included in and/or used with the improved cleaning composition that includes the cationic biocide to reduce the cationic biocide retention on an absorbent and/or adsorbent material (e.g., cleaning wipes, sponges (e.g., cellulose, synthetic, etc.), paper towels, napkins, cloths, towels, rags, mop heads, etc.) to less than about 50%. In one aspect of this embodiment, the improved cleaning composition includes and/or is used with a sufficient amount of biocide release agent to reduce the cationic biocide retention on the absorbent and/or adsorbent material to less than about 45%. In another aspect of this embodiment, the improved cleaning composition includes and/or is used with a sufficient amount of biocide release agent to reduce the cationic biocide retention on the absorbent and/or adsorbent material to less than about 40%. In still another aspect of this embodiment, the improved cleaning composition includes and/or is used with a sufficient amount of biocide release agent to reduce the cationic biocide retention on the absorbent and/or adsorbent material to less than about 35%. In yet another aspect of this embodiment, the

about 5 x 10^{-3} mol/l does not result in an appreciable increase in cationic biocide release from the absorbent and/or adsorbent material. In another aspect of this embodiment, the effective ionic strength of the biocide release agent in the improved cleaning composition and/or used in combination with the improved cleaning composition is about 5 x 10^{-3} - 18 mol/l. In still another aspect of this embodiment, the effective ionic strength of the biocide release agent in the improved cleaning composition and/or used in combination with the improved cleaning composition is at least about 1 x 10^{-2} mol/l. In yet another aspect of this embodiment, the effective ionic strength of the biocide release agent in the improved cleaning composition and/or used in combination with the improved cleaning composition is about 1 x 10^{-2} - 5 mol/l. In still yet another aspect of this embodiment, the effective ionic strength of the biocide release agent in the improved cleaning composition and/or used in combination with the improved cleaning composition is about 2 x 10^{-2} - 1 mol/l. In a further aspect of this embodiment, the effective ionic strength of the biocide release agent in the improved cleaning composition and/or used in combination with the improved cleaning composition is about 3 x 10^{-2} - 0.4 mol/l. In yet a further aspect of this embodiment, the effective ionic strength of the biocide release agent in the improved cleaning composition and/or used in combination with the improved cleaning composition is about 4 x 10^{-2} - 0.2 mol/l. The weight percent of the biocide release agent in the improved cleaning composition and/or used in combination with the improved cleaning composition to achieve a particular ionic strength in the improved cleaning composition is at least partially a function of the molecular weight of the biocide release agent and the ionic strength of the biocide release agent. In yet a further and/or alternative embodiment, the biocide release agent content of the improved cleaning composition and/or the amount of biocide release agent used in combination with the improved cleaning composition is at least about 0.025 weight percent and can constitute up to about 90 weight percent. In one aspect of this embodiment, the biocide release agent content of the improved cleaning composition and/or amount of biocide release agent used in combination with the improved cleaning composition is about 0.03 - 10 weight percent. In another aspect of this embodiment, the biocide release agent content of the improved cleaning composition and/or amount of biocide release agent used in combination with the improved cleaning composition is about 0.04 - 5 weight percent. In still

includes polyacetate and/or polycarboxylate compounds. In one aspect of this embodiment, the polyacetate and/or polycarboxylate compounds include, but are not limited to, sodium, potassium, lithium, ammonium, and substituted ammonium salts of ethylenediamine tetraacetic acid, ethylenediamine triacetic acid, ethylenediamine tetrapropionic acid, diethylenetriamine pentaacetic acid, nitrilotriacetic acid, oxydisuccinic acid, iminodisuccinic acid, mellitic acid, polyacrylic acid or polymethacrylic acid and copolymers, benzene polycarboxylic acids, gluconic acid, sulfamic acid, oxalic acid, phosphoric acid, phosphonic acid, organic phosphonic acids, acetic acid, and citric acid. These builder detergents can also exist either partially or totally in the hydrogen ion form. In another and/or alternative aspect of this embodiment, the builder detergent includes EDTA and/or EDTA salts. When EDTA salts are included in the improved cleaning composition, the EDTA salts can contribute to the release of the cationic biocide from the absorbent and/or adsorbent material when the improved cleaning composition is loaded on and/or is used in combination with the absorbent and/or adsorbent material. The cationic properties of the EDTA salts compete for the anionic species sites on the absorbent and/or adsorbent material thereby causing some cationic biocide to be released from the absorbent and/or adsorbent material. Although the EDTA salts contribute to some cationic biocide release when sufficient amounts of EDTA salts are included in the improved cleaning composition, the amount of cationic biocide release attributable to the EDTA salts is very small due to the low ionic strength of the EDTA salts. Consequently, EDTA salts in the improved cleaning composition are not a substitute for the biocide release agent, and the absence of a biocide release agent from the improved cleaning composition results in little or no measurable reduction in cationic biocide retention from the absorbent and/or adsorbent material. In one specific aspect, the builder agent includes sodium and/or potassium salts of EDTA. In still another and/or alternative embodiment, the builder detergent includes substituted ammonium salts. In one aspect of this embodiment, the substituted ammonium salts include, but are not limited to, ammonium salts of methylamine, dimethylamine, butylamine, butylenediamine, propylamine, triethylamine, trimethylamine, monoethanolamine, diethanolamine, triethanolamine, isopropanolamine, ethylenediamine tetraacetic acid and/or propanolamine. In yet another and/or alternative embodiment, the improved cleaning composition includes and/or is used in combination with at least

embodiment, the solvent rapidly volatilizes. In one aspect of this embodiment, the solvent has a vapor pressure of at least about 0.001 mm Hg at about 25° C. In another and/or alternative aspect of this embodiment, the solvent volatilizes in no more than about 5 minutes at ambient temperature (about 25° C) after contact with a surface. In another and/or alternative embodiment, the solvent volatilizes from a surface substantially without leaving a residue. In still another and/or alternative embodiment, the solvent includes, but is not limited to, C_{1-6} alkanols, C_{1-6} diols, C_{1-10} alkyl ethers of alkylene glycols, C_{3-24} alkylene glycol ethers; and discrete amounts of polyalkylene glycols, short chain carboxylic acids, short chain esters, isoparafinic hydrocarbons, mineral spirits, alkylaromatics, terpenes, terpene derivatives, terpenoids, terpenoid derivatives, formaldehyde, and/or pyrrolidones. In one aspect of this embodiment, the alkanol includes, but is not limited to, methanol, ethanol, –propanol, isopropanol, butanol, pentanol, and/or hexanol, and their various positional isomers. In another and/or alternative aspect of this embodiment, the diols include, but are not limited to, methylene, ethylene, propylene and/or butylene glycols. In still another and/or alternative aspect of this embodiment, alkylene glycol ether solvents include, but are not limited to, ethylene glycol monopropyl ether, ethylene glycol monobutyl ether, propylene glycol –propyl ether, propylene glycol monobutyl ether, propylene glycol t-butyl ether, diethylene glycol monoethyl or monopropyl or monobutyl ether, di- or tri-polypropylene glycol methyl or ethyl or propyl or butyl ether, acetate and/or propionate esters of glycol ethers. In yet another and/or alternative aspect of this embodiment, the short chain carboxylic acids include, but are not limited to, acetic acid, glycolic acid, lactic acid and/or propionic acid. In still yet another and/or alternative aspect of this embodiment, the short chain esters include, but are not limited to, glycol acetate, and/or cyclic or linear volatile methylsiloxanes. In a further and/or alternative aspect of this embodiment, water insoluble solvents such as isoparafinic hydrocarbons, mineral spirits, alkylaromatics, terpenoids, terpenoid derivatives, terpenes, and/or terpenes derivatives are mixed with a water soluble solvent when included in the improved cleaning composition. When one or more water insoluble solvents are mixed with one or more water soluble solvents in and/or used in combination with the improved cleaning composition, the weight percentage of the water insoluble solvents in the improved cleaning composition is generally less than about 10 weight percent, typically less than about 5 weight

of this embodiment, the solvent content in and/or combined with the improved cleaning composition is about 0.75 - 6 weight percent. In a further aspect of this embodiment, the solvent content in and/or combined with the improved cleaning composition is about 1 - 5 weight percent. In still a further aspect of this embodiment, the solvent content in and/or combined with the improved cleaning composition is about 2 - 4 weight percent. In yet a further aspect of this embodiment, the solvent content in and/or combined with the improved cleaning composition is about 2.5 - 4 weight percent.

In still yet another and/or alternative aspect of the present invention, the improved cleaning composition includes and/or is used in combination with a high and a low boiling point solvent. As defined herein, a high boiling point solvent is a solvent having a boiling point of at least about 150°C (302°F). As defined herein, a low boiling point solvent is a solvent having a boiling point of less than about 150°C (302°F). The high and low boiling point solvent is a compound other than water. Other solvents, in addition to one solvent from each category, may be included. In another and/or alternative embodiment, the solvents having a boiling point less than about 150°C include, but are not limited to, methanol, ethanol, isopropanol, propanol, butyl alcohol, sec-butyl alcohol, isobutyl alcohol, tert-butyl alcohol, pentyl alcohol, tert-pentyl alcohol, 2-pentanol, 3-pentanol, neopentyl alcohol, ethyleneglycol methylether, ethyleneglycol ethylether, ethyleneglycol propylether, propyleneglycol methylether, propyleneglycol ethylether, ethyleneglycol methyletheracetate, and/or propyleneglycol methyletheracetate. In still another and/or alternative embodiment, the solvents having a boiling point greater than or equal to about 150°C include, but are not limited to, ethylene glycol, propylene glycol, butanediol, methylpropanediol, ethyleneglycol butylether, ethyleneglycol hexylether, ethyleneglycol ethylhexylether, diethyleneglycol methylether, diethyleneglycol ethylether, diethyleneglycol propylether, diethyleneglycol butylether, propyleneglycol propylether, propyleneglycol t-butylether, propyleneglycol butylether, dipropyleneglycol methylether, dipropyleneglycol ethylether, dipropyleneglycol propylether, dipropyleneglycol t-butylether, dipropyleneglycol butylether, tripropyleneglycol methylether, tripropyleneglycol butylether, ethyleneglycol ethyletheracetate, propyleneglycol ethyletheracetate, ethyleneglycol butyletheracetate, propyleneglycol butyletheracetate, diethyleneglycol methyletheracetate, dipropyleneglycol methyletheracetate, diethyleneglycol ethyletheracetate, dipropyleneglycol ethyletheracetate,

use, or the concentrated improved cleaning composition has been diluted with water and/or other solvents. In another and/or alternative aspect of this embodiment, the water content in the ready to use improved liquid cleaning composition is at least about 80 weight percent. In still another and/or alternative aspect of this embodiment, the water content in the ready to use improved liquid cleaning composition is at least about 90 weight percent. In yet another and/or alternative aspect of this embodiment, the water content in the ready to use improved cleaning composition is at least about 95 weight percent.

In a further and/or alternative aspect of the present invention, the improved cleaning composition includes and/or is used in combination with one or more anti-dye transfer agents. When the improved cleaning composition is used to clean and/or is used in combination with other cleaners to clean fabrics that include dyes (e.g., clothing, rugs, carpets, curtains, pillows, sheets and/or pillowcases, blankets, etc.), the one or more anti-dye transfer agents in the improved cleaning composition inhibit dry transfer during the cleaning operation. One way of overcoming the dye transfer problem is to at least partially complex or adsorb the fugitive dyes before such dyes have the opportunity to become attached to other articles. The anti-dry transfer agent is formulated to provide anti-dye transfer and color protection properties to the improved cleaning composition without adversely affecting stain or soil removal properties and/or soil redeposition properties of the improved cleaning composition. In one embodiment, the anti-dye transfer agent can include, but is not limited to, polyvinylpyrrolidone; quaternary polyvinylpyrridinium derivatives; polyvinylimidazole; polyvinylpyridine oxide; copolymers of polyvinylpyridine and polyvinylimidazole; vinyl imidazole homo- or copolymer; polyamine oxide; vinylimidazole; vinylpyrrolidone; vinylimidazole; vinylpyridine; dimethylaminoethyl methacrylate; dimethylaminopropylmethacrylamide; poly(4-vinylpyridine-N-oxide); copolymers of vinylpyrrolidone and vinylimidazole; copolymers of polyvinylpyrrolidone and vinylimidazole; copolymers of vinylpyrrolidone and polyvinylimidazole; copolymers vinylimidazole, vinyloxazolidone and/or –vinylpyrrolidone; polymeric compounds based on –vinylpyrrolidone and/or –vinylimidazole and/or –vinyloxazolidone; vinyloxazolidone; and/or poly(vinylpyridine betaines). Several of these anti-dye transfer agents which can be included in and/or used in

spermaceti, candelilla, paraffin, lanolin, shellac, esparto, ouricuri, polyethylene wax, chlorinated naphthalene wax, petrolatum, microcrystalline wax, ceresine wax, ozokerite wax, and/or rezowax. In yet another and/or alternative embodiment, the solubilizing materials, when used, include, but are not limited to, hydrotropes (e.g., water soluble salts of low molecular weight organic acids such as the sodium and/or potassium salts of xylene sulfonic acid). In another and/or alternative embodiment, the acids, when used, include, but are not limited to, organic hydroxy acids, citric acids, keto acid, and the like. In still another and/or alternative embodiment, thickeners, when used, include, but are not limited to, polyacrylic acid, xanthan gum, calcium carbonate, aluminum oxide, alginates, guar gum, methyl, ethyl, clays, and/or propylhydroxycelluloses. In yet another and/or alternative embodiment, defoamers, when used, include, but are not limited to, silicones, aminosilicones, silicone blends, and/or silicone/hydrocarbon blends. In still yet another and/or alternative embodiment, lotions, when used, include, but are not limited to, achlorophene and/or lanolin. In a further and/or alternative embodiment, enzymes, when used, include, but are not limited to, lipases, proteases, amylases, cellulases, and/or peroxidases, and/or hydrotropes such as xylene sulfonates and/or toluene sulfonates. In yet a further and/or alternative embodiment, bleaching agents, when used, include, but are not limited to, peracids, perborates, percarbonates, chlorine-generating substances (e.g., chloroisocyanurates hypohalite sources), hydrogen peroxide, and/or sources of hydrogen peroxide. In still a further and/or alternative embodiment, preservatives, when used, include, but are not limited to, mildewstat of bacteriostat, methyl, ethyl and propyl parabens, short chain organic acids (e.g., acetic, lactic and/or glycolic acids), bisguanidine compounds (e.g., Dantagard and/or Glydant) and/or short chain alcohols (e.g., ethanol and/or IPA). In one aspect of this embodiment, the mildewstat of bacteriostat includes, but is not limited to, mildewstats (including non-isothiazolone compounds) include Kathon GC, a 5-chloro-2-methyl-4-isothiazolin-3-one, Kathon ICP, a 2-methyl-4-isothiazolin-3-one, and a blend thereof, and Kathon 886, a 5-chloro-2-methyl-4-isothiazolin-3-one, all available from Rohm and Haas Company; Bronopol, a 2-bromo-2-nitropropane 1, 3diol, from Boots Company Ltd.; Proxel CRL, a propyl-p-hydroxybenzoate, from ICI PLC; Nipasol M, an o-phenyl-phenol, Na+ salt, from Nipa Laboratories Ltd.; Dowicide A, a 1,2-Benzoisothiazolin-3-one, from Dow Chemical Co.; and Irgasan DP 200, a

acetoacetoxy methacrylate or other acetoacetate monomers, and/or divinyl or polyvinyl monomers, such as glycol polyacrylates, allyl methacrylate, and divinyl benzene. In a further and/or alternative aspect of this embodiment, polyvinylpyrrolidone includes, but is not limited to, copolymers of vinylpyrrolidone with one or more aklylenically unsaturated monomers such as unsaturated dicarboxylic acids such as maleic acid, chloromaleic acid, fumaric acid, itaconic acid, citraconic acid, phenylmaleic acid, aconitic acid, acrylic acid, methacrylic acid, vinylimidazole, vinylcaprolactam, butene, hexadecene, and vinyl acetate. In addition, any of the esters and amides of the unsaturated acids can be employed, for example, methyl acrylate, ethylacrylate, acrylamide, methacryamide, dimethylaminoethylmethacrylate, dimethylaminopropylmethacrylamide, trimethylammoniumethylmethacrylate, and/or trimethylammoniumpropylmethacrylamide. Other suitable alkylencially unsaturated monomers include, but are not limited to, aromatic monomers such as, but not limited to, styrene, sulphonated styrene, alpha-methylstyrene, vinyltoluene, t-butylstyrene and others. In one particular example, the polyvinylpyrrolidone includes a copolymer of vinylpyrrolidone and dimethylaminoethylmethacrylate quaternized with diethylsulfate (e.g., Gafquat HSi, HS-100, 440, 734, 755, 755N, and/or 755N-P by ISP Corp.). The inclusion of polyvinylpyrrolidone enhances the cleaning effectiveness of the cleaning surfactant in the improved cleaning composition without adversely affecting the filming and streaking properties of the improved cleaning composition. Typically, the polyvinylpyrrolidone is a cationic polymer that is combined with a non-ionic surfactant; however, other types of surfactants can be used in combination with the polyvinylpyrrolidone. In yet a further and/or alternative aspect of this embodiment, the silicones include, but are not limited to, polysicoxanes. The inclusion of silicones in the improved cleaning composition can facilitate in enhancing the ease in which the improved cleaning composition can be spread over a surface such as, but not limited to, a hard surface. The increase in ease of spreading can result in the ease in which the improved cleaning composition applied over a surface to be cleaned. The silicone can decrease the static coefficient of friction, thereby resulting in the improved cleaning composition being spread easer by a cleaning pad, wipe, mop, etc. In one particular example, the silicone is a volatile silicone that evaporates upon drying without leaving surface residue and/or a slippery surface. In another and/or alternative particular

and/or sodium 2(stilbyl-4^{11}-(naphtho-1^{1},2^{1}:4,5)-1,2,3-triazole-2^{11} -sulphonate. In a further and/or alternative aspect of this embodiment, the soil release agents include, but are not limited to, copolymers or terpolymers of terephthalic acid with ethylene glycol and/or propylene glycol, ethoxylated/propoxylated polyamines, modified polyesters (e.g., dimethyl terephtalate, dimethyl sulfoisophtalate, ethylene glycol and 1-2 propane diol, etc.). In still a further and/or alternative aspect of this embodiment, the polymer includes vinylpyrrolidone homo- and copolymers, acrylamide homo- and copolymers, polyvinylalcohol and polyvinylacetate homo- and copolymers, quaternary acrylate and methacrylate copolymers, and/or amphoteric acrylate and methacrylate homo- and copolymers. In one specific example, the polmyer includes polyvinylpyrrolidone compound, and/or quaternary acrylic copolymer. Other various adjuncts that can be included in and/or used in combination with the improved cleaning composition are disclosed in United States Patent Nos. 6,306,815 and 6,313,086, which are incorporated herein by reference.

In still a further and/or alternative aspect of the present invention, the improved cleaning composition has a neutral or alkaline pH. Various compounds (e.g., adjuncts, biocides, etc.) can be added to and/or used in combination with the improved cleaning composition to control the pH of the improved cleaning composition. In one embodiment, the pH of the cleaning composition is alkaline. In one aspect of this embodiment, the pH of the improved cleaning composition is between about 7-12. In another aspect of this embodiment, the pH of the improved cleaning composition is between about 7.2-10.5.

The principal object of the present invention is to provide an improved cleaning composition having improved cleaning attributes.

Another and/or alternative object of the present invention is to provide an improved cleaning composition having improved disinfecting, sanitizing, and/or sterilizing properties.

Yet another and/or alternative object of the present invention is to provide an improved cleaning composition that can be pre-loaded or post-loaded on an absorbent or absorbent material.

Still another and/or alternative object of the present invention is to provide an improved cleaning composition that exhibits improved cationic biocidal release from an absorbent or absorbent material.

composition can be used in soaps, lotions, and/or shampoos.

Still another and/or alternative object of the present invention is to provide an improved cleaning composition that is alkaline.

These and other objects and advantages will become apparent to those skilled in the art upon reading and following the description of the invention taken together with the accompanied drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference may now be made to the drawings, which illustrates various attributes of the invention wherein;

FIGURE 1 is a graphical illustration of the percentage of quat recovered from the cleaning wipe as a function of the weight percentage of several different type of salts in the improved cleaning composition;

FIGURE 2 is a graphical illustration of the percentage of biguanide compound recovered from the cleaning wipe as a function of the weight percentage of salt in the improved cleaning composition; and

FIGURE 3 is a graphical illustration of dermal irritation scores of several improved cleaning compositions of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The improved cleaning composition of the present invention can be used independently from or in conjunction with an absorbent and/or adsorbent material. For instance, the improved cleaning composition is formulated to be used in conjunction with a cleaning wipe, sponge (e.g., cellulose, synthetic, etc.), cleaning pad, paper towel, napkin, cloth, towel, rag, mop head, squeegee, and/or other cleaning device that includes an absorbent and/or adsorbent material. The improved cleaning composition can be formulated to be loaded onto and/or used in combination with an absorbent and/or adsorbent material (e.g., cleaning wipe, cleaning pad, mop head, cloth, towel, etc.) to clean hard surfaces. The improved cleaning composition can also or alternatively be formulated to clean fabrics (e.g., clothing, carpet, curtains, rugs, etc.). The improved cleaning composition can also or alternatively be formulated to disinfect and/or sanitize various areas and things (e.g., rooms, pet

properties. The biguanide compounds are also less irritating to skin, and produce less streaking and residue when applied to a hard surface. As a result, the improved cleaning composition feels drier after being applied resulting in higher consumer satisfaction. A variety of different biguanide compounds can be used in the improved cleaning composition. The biguanide compounds that can be used in the improved cleaning composition include, but are not limited to, compounds have the following general formula:

$$Y_1 - [X_1 - NH - \underset{\underset{NZ_1}{\|}}{C} - NH - \underset{\underset{NZ_2}{\|}}{C} - NH - X_2]_M - Y_2$$

where X_1 and X_2 are either a hydrogen or any aliphatic, cycloaliphatic, aromatic, substituted aliphatic, substituted aromatic, heteroaliphatic, heterocyclic, and/or heteroaromatic compound. X_1 and X_2 can be the same or different. Y_1 and Y_2 are any aliphatic, cycloaliphatic, aromatic, substituted aliphatic, substituted aromatic, heteroaliphatic, heterocyclic, and/or heteroaromatic compound. Y_1 and Y_2 can be the same or different. M is an number equal to or greater than 1. Typically, M has an average value such that the molecular weight biguanide compounds is about 1000-1400; however, the molecular can be higher or lower. Generally M is about 2-20. Z_1 and Z_2 are either a hydrogen or a salt. Z_1 and Z_2 can be the same of different. In addition or alternatively, the biguanide compounds include, but are not limited to, halogenated hexidine and its salts. One particular nonlimiting biguanide compound that can be used in the improved cleaning composition is Vantocil P. The biguanide compound content of the improved cleaning composition is generally maintained at least above 0.0005 weight percent, and more generally above about 0.02 weight percent and less than about 20 weight percent; however, higher or lower biguanide compound contents can be used. Typically, the biguanide compound content of the improved cleaning composition is about 0.1-0.5 weight percent. The weight percentage range for the biguanide compound in the improved cleaning composition is selected to disinfect, sanitize, and/or sterilize most common household, institutional, and industrial hard surfaces. Common types of bacteria that are at least partially destroyed by biguanide compounds in the improved cleaning composition include, but are not limited to, Staphylococcus aureus (Staph), Kleb, Salmonella choleraesuis (Salmonella), Pseudomonas aeruginosa, Pserratia marcescens, Influenza A2, Candida albicans, Fusarium solani, common viruses

cleaning composition; however, the quat content can be greater than the biguanide compound content. The weight percentage range for the quat in the improved cleaning composition is selected to disinfect, sanitize, and/or sterilize most common household, institutional, and industrial hard surfaces. Common types of bacteria that are at least partially destroyed by the quat in the improved cleaning composition include, but are not limited to, Staphylococcus aureus (Staph), Kleb, Salmonella choleraesuis (Salmonella), Pseudomonas aeruginosa, Pserratia marcescens, Influenza A2, Candida albicans, Fusarium solani, common viruses and/or fungi.

B. The Solvent

The solvent used in and/or in combination with the improved cleaning composition is selected to at least partially dissolve into solution the biguanide compound, quat, and/or other organic compounds in the improved cleaning composition. The use of certain solvents can also improve the cleaning, biocidal and/or detergency properties of the improved cleaning composition. Typically, the solvent is water soluble and rapidly volatilizes substantially without leaving a residue, causing streaking, and/or leaving a sticky surface. The solvent also typically has a vapor pressure of at least about 0.001 mm Hg at about 25° C, and volatilizes in no more than about 5 minutes at ambient temperature (about 25°C) after contact with a surface.

Generally, the one or more solvents include in and/or used in combination with the improved cleaning composition include, but are not limited to, C_{1-6} alkanols, C_{1-6} diols, C_{1-10} alkyl ethers of alkylene glycols, C_{3-24} alkylene glycol ethers, and/or polyalkylene glycols. The solvent content of the improved cleaning composition is generally maintained above about 0.1 weight percent and generally less than about 10 weight percent; however, higher or lower solvent contents can be used. Typically, the solvent content of the improved cleaning composition is about 0.5 - 5 weight percent. The lower solvent weight percentages are especially desirable in jurisdictions wherein regulations require solvent concentrations of less than about 4-10 weight percent in the improved cleaning composition.

Various solvent combinations in the improved cleaning composition can also facilitate in the reduction of filming and/or streaking. One particular solvent combination that results in reduced filming and/or streaking is a solvent combination that includes a high and a low boiling point solvent

C. **The Surfactant**

The surfactant used in and/or in combination with the improved cleaning composition is selected to improve the cleaning performance of the improved cleaning composition. The surfactant can also reduce the amount of perceived filming and/or streaking of the improved cleaning composition. The surfactant also can provide detergency to the improved cleaning composition to facilitate in the removal of soil from the hard surface. The surfactant also can reduce the amount of redeposition of soils onto the hard surface.

Generally the surfactant includes, but is not limited to, at least one lauryl sulfate, laurylether sulfate, cocamidopropylbetaine, alkyl polyglycoside, ethoxylated alcohol, fluorosurfactant, and/or amine oxide. In one particular formulation, the surfactant in and/or used in combination with the improved cleaning composition includes alkyl polyglycosides, ethoxylated alcohol, fluorosurfactant and/or amine oxides. One particular not limiting example of alkyl polyglycosides, ethoxylated alcohol, fluorosurfactant and/or amine oxides that can be included in the improved cleaning composition are amine oxides sold under the brand Barlox by Lonza, alkyl polyglycosides sold under the brand APG by Cognis, ethoxylated alcohol sold under the Surfonic by Huntsman, and/or fluorosurfactant sold under the brand Zonyl by DuPont. The surfactant content in and/or used in combination with the improved cleaning composition is generally at least about 0.001 weight percent of the improved cleaning composition, typically at least about 0.05 weight percent and less than about 10 weight percent of the improved cleaning composition, and more typically about 0.06-2 weight percent of the improved cleaning composition.

D. **The Absorbent and/or Adsorbent Material**

The improved cleaning composition, when used to clean hard surfaces, is generally used in conjunction with one or more absorbent and/or adsorbent materials. The improved cleaning composition can be sprayed and/or poured onto a hard surface to be cleaned and an absorbent and/or adsorbent material such as, but not limited to, a sponge, mop head, cloth, towel, and the like is then used to spread the improved cleaning composition on the hard surface and/or clean the hard surface. Additionally or alternatively, the improved cleaning composition is at least partially loaded on the absorbent and/or adsorbent material prior to the absorbent and/or adsorbent material at least partially

The loading ratio of the improved cleaning composition onto the cleaning wipe or cleaning pad can be about 2-5:1, and typically about 3-4:1; however, other loading rations can be used. The improved cleaning composition can be loaded onto the cleaning wipe and/or cleaning pad in any number of manufacturing methods. Typically, the cleaning wipe or cleaning pad is soaked in the improved cleaning composition for a period of time until the desired amount of loading is achieved.

The cleaning pad or cleaning wipe can also have an attachment layer that allows the cleaning pad or cleaning wipe to be connected to and/or disconnected from an implement's handle or the support head or an implement (e.g., mop, broom, etc.). The attachment layer can also function to prevent fluid flow through the top surface (e.g., the handle-contacting surface) of the cleaning pad or cleaning wipe, and/or can further provide enhanced integrity for the cleaning pad or cleaning wipe.

The cleaning pad or cleaning wipe can also be part of a cleaning kit. The kit can have an assembly of one or more units, either packaged together or separately. The kit can comprise an implement containing a cleaning pad or cleaning wipe that may or may not include a superabsorbent material, and the improved cleaning composition. The cleaning pad or cleaning wipe can be detachably mounted on the implement so that the cleaning pad or cleaning wipe can be removed and/or replaced with a fresh clean pad or cleaning wipe. The implement can also include a dosing device that delivers the improved cleaning composition on the cleaning pad or cleaning wipe and/or on the hard surface to be cleaned. The dosing device can be battery powered, electrically powered, or hand powered. The implement can also have a reservoir that contains the improved cleaning composition. The reservoir can be refillable or contain a non-refillable amount of improved cleaning composition. The reservoir can also be detachably mounted on the implement to allow for easy refilling or replacing with a filled reservoir.

E. Water

The improved cleaning composition typically includes water. When the improved cleaning composition is a liquid, water based, ready-to-use cleaner, the water content of the improved cleaning composition is generally over 50 weight percent of the improved cleaning composition. Typically, the liquid ready-to-use improved cleaning composition includes at least about 80 weight percent water; however, higher or lower water contents can be used. When the improved cleaning

with the improved cleaning composition is about 1 x 10^{-2} - 2 mol/l, and the weight percent of the salt used in and/or in combination with the improved cleaning composition is about 0.04 - 5 weight percent.

G. Additional Anti-Microbial Compound

One or more additional anti-microbial compounds can be included in and/or used in combination with the improved cleaning composition to enhance the biocidal efficacy of the improved cleaning composition. Such anti-microbial compounds include, but are not limited to, diisobutylphenoxyethoxyethyl dimethylbenzyl ammonium chloride, commercially available as Hyamine 1622 from Lonza. Other anti-microbial compounds include, but are not limited to, alcohols, peroxides, boric acid and borates, chlorinated hydrocarbons, organometallics, halogen-releasing compounds, mercury compounds, metallic salts, pine oil, essential oils, organic sulfur compounds, iodine compounds, silver nitrate and other silver compounds, quaternary phosphate compounds, and/or phenolics.

H. Polymer

Various types of polymers can also be included in and/or used in combination with the improved cleaning composition. These polymers are typically added to the improved cleaning composition to enhance the detergency of the improved cleaning composition, improved wetting of the improved cleaning composition, and/or reduce filming and/or streaking of the improved cleaning composition. The polymers, when used, include, but are not limited to, polysaccharides, polycarboxylates, polystyrenesulfonates, acrylate polymers, polyethyleneimines, polyvinylpyrrolidones, polymethylvinyl ether, polyvinyl alcohols, silicones, polyethylene glycols, and/or copolymers thereof. Polymers that have improved the detergency of the improved cleaning composition include, but are not limited to a copolymer of vinylpyrrolidone and dimethylaminoethylmethacrylate quaternized with diethylsulfate (e.g., Gafquat HSi, HS-100, 440, 734, 755, 755N, and/or 755N-P by ISP Corp.), and/or quaternary acrylic copolymer (e.g., Syntran HX52-1-1 (Interpolymer)). The inclusion of these polymers has been found to enhance the cleaning effectiveness of the cleaning surfactant (e.g., alkylpolyglucosides, etc.) in the improved cleaning composition without significantly adversely affecting the filming and streaking properties of the

CLX-13261

EXAMPLE 2

Cationic Biocide	0.02 - 5%
Solvent	0 - 20%
Surfactant	0.001 - 5%
Builder detergent	0 - 2%
Polymer	0 - 10%
Biocide release agent	0 - 5%
Water	at least 68%

EXAMPLE 3

Cationic Biocide	0.05 - 5%
Solvent	0.5 - 70%
Surfactant	0.001 - 5%
Builder detergent	0.001 - 2%
Polymer	0 - 5%
Biocide release agent	0.03 - 10%
Water	at least 10%

EXAMPLE 4

Cationic Biocide	0.04 - 2%
Solvent	0.04 - 10%
Surfactant	0.01 - 5%
Builder detergent	0 - 2%
Polymer	0.01 - 2%
Biocide release agent	0 - 2.5%
Water	at least 78.5%

CLX-13261

EXAMPLE 8

Cationic Biocide	0.15 - 0.8%
Solvent	2 - 10%
Surfactant	0.075 - 2%
Builder detergent	0.01 - 0.8%
Polymer	0.1 - 1%
Biocide release agent	0.1 - 2.5%
Water	at least 80%

EXAMPLE 9

Cationic Biocide	0.1 - 1%
Solvent	0.1 - 5%
Surfactant	0.1 - 4%
Builder detergent	0 - 1%
Polymer	0.1 - 1%
Biocide release agent	0 - 2%
Water	at least 87%

EXAMPLE 10

Cationic Biocide	0.2 - 0.5%
Solvent	2.75 - 8%
Surfactant	0.15 - 0.8%
Builder detergent	0.05 - 0.5%
Polymer	0.1 - 1%
Biocide release agent	0.5 - 2%
Water	at least 85%

CLX-13261

Biocide release agent	0.75 - 1.8%
Water	at least 85%

EXAMPLE 14

Vantocil P	0.3 - 0.5%
Isopropanol	3 - 5%
Lauryl Dimethyl Amine Oxide	0.2 - 0.4%
Sodium Citrate	0.9 - 1.1%
DiPotassium EDTA	0.09 - 0.15%
Gafquat 440	0.1 - 0.8%
Fragrance	0 - 1%
Water	at least 90%

EXAMPLE 15

Barquat 4250Z/Vantocil P	0.3 - 0.4%
Isopropanol	3.5 - 5%
Lauryl Dimethyl Amine Oxide	0.2 - 0.4%
Disodium EDTA	0.09 - 0.15%
Gafquat 440	0 - 0.8%
Potassium Citrate	0.9 - 1.1%
Water	at least 90%

EXAMPLE 16

BTC 2250/Vantocil P	0.3 - 0.4%
Isopropanol	3.5 - 5%
Lauryl Dimethyl Amine Oxide	0.2 - 0.4%

CLX-13261

EXAMPLE 19

Vantocil P	0.05 - 0.6%
Isopropanol	1 - 3%
Dowanol PnP	0.5 - 2%
Lauryl Dimethyl Amine Oxide	0 - 1%
PnB (glycol ether)	0 - 2%
APG 325	0.05 - 1%
DiPotassium EDTA	0 - 0.5%
Gafquat 440	0.05 - 0.5%
Ammonium Chloride	0 - 0.4%
Fragrance	0 - 0.5%
Water	at least 92%

EXAMPLE 20

Vantocil P	0.05 - 0.5%
Isopropanol	1 - 3%
Dowanol PnP	0.75 - 1.5%
Lauryl Dimethyl Amine Oxide	0 - 1%
PnB (glycol ether)	0 - 1%
APG 325	0.1 - 0.5%
DiPotassium EDTA	0 - 0.5%
Gafquat 440	0.05 - 0.4%
Ammonium Chloride	0 - 0.4%
Fragrance	0 - 0.5%
Water	at least 94%

Several specific, nonlimiting examples of the improved cleaning composition loaded onto a cleaning wipe in weight percentage of the loaded cleaning wipe are as follows:

CLX-13261

Builder detergent	0 - 0.8%
Polymer	0 - 2.083%
Biocide release agent	up to 1.6%
Water	at least 58%
Dry cleaning wipe	20 - 33%
Loading ratio	2 - 4:1

wherein the ionic strength of the biocide release agent is at least about 2x 10^{-2} mol/l.

EXAMPLE 24

Cationic Biocide	0.1 - 0.64%
Solvent	1.3 - 8%
Surfactant	0.05 - 1.6%
Builder detergent	0.0067 - 0.64%
Polymer	0.01 - 2.083%
Biocide release agent	0.067 - 2%
Water	at least 53%
Dry cleaning wipe	20 - 33%
Loading ratio	2 - 4:1

wherein the ionic strength of the biocide release agent is at least about 2x 10^{-2} -1 mol/l.

EXAMPLE 25

Vantocil P	0.117 - 0.4%
Isopropanol	1.36 - 4%
PnB (glycol ether)	0.389 - 1.5%
APG 325	0.194 - 1%
Ammonium Chloride	0.0389 - 1%
Dipotassium EDTA	0 - 0.3%
Gafquat 440	0 - 2.083%

CLX-13261

Fragrance	0.01 - 0.5%
Water	at least 70%
DuPont 8838	20 - 22.2%
Loading ratio	3.5 - 4:1
pH	Alkaline

wherein the ionic strength of the salts in the improved cleaning composition is about 3.5×10^{-2} - 5 $\times 10^{-2}$ mol/l.

EXAMPLE 28

Vantocil P	0.15 - 0.4%
Isopropanol	2.5 - 4%
PnB (glycol ether)	0.05 - 2%
Surfonic L108	0.2 - 0.5%
Zonyl FSO	0 - 1%
Ammonium Chloride	0.05 - 0.8%
Dipotassium EDTA	0.07 - 0.12%
Gafquat 440	0.02 - 1.042%
Fragrance	0 - 2%
Water	at least 70%
DuPont 8838	20 - 22.2%
Loading ratio	3.5 - 4:1
pH	Alkaline

wherein the ionic strength of the salts in the improved cleaning composition is about 3.5×10^{-2} - 5 $\times 10^{-2}$ mol/l.

EXAMPLE 29

Vantocil P	0.1 - 0.5%
Isopropanol	1.3 - 4%

CLX-13261

EXAMPLE 31

Vantocil P	0.038 - 0.48%
Isopropanol	0.77 - 2.4%
Dowanol PnP	0.38 - 1.6%
Lauryl Dimethyl Amine Oxide	0 - 0.8%
PnB (glycol ether)	0 - 1.6%
APG 325	0.038 - 0.8%
DiPotassium EDTA	0 - 0.4%
Gafquat 440	0.038 - 0.4%
Ammonium Chloride	0 - 0.32%
Fragrance	0 - 0.4%
Water	at least 70%
DuPont 8838	20 - 22.2%
Loading ratio	3.5 - 4:1
pH	Alkaline

wherein the ionic strength of the salts in the improved cleaning composition is about 3.5×10^{-2} - 5 $\times 10^{-2}$ mol/l.

EXAMPLE 32

Vantocil P	0.038 - 0.4%
Isopropanol	0.77 - 2.4%
Dowanol PnP	0.577 - 1.2%
Lauryl Dimethyl Amine Oxide	0 - 0.8%
PnB (glycol ether)	0 - 0.8%
APG 325	0.077 - 0.4%
DiPotassium EDTA	0 - 0.4%
Gafquat 440	0.038 - 0.32%

0.00304					67.4
0.00595					73.1
0.1013	57	60	59	71	75.9
0.304	75	69	73	79	82.1
0.697	88	77	90	91	82.4
1.0	98	86	89	96	96.3

The improved cleaning composition that included biguanide compounds and was also loaded on a cleaning wipe, and a single trial was conducted using Dexter 8589 for the cleaning wipe and Vantocil P (PHMB) by Avecia for the biguanide compound. The improved cleaning composition included about 0.3 weight percent biguanide compound, about 0.5 weight percent APG, 2.6 weight percent isopropanol, about 1 weight percent Dowanol PnB, and the balance water. The cleaning wipe had a loading ratio of improved cleaning composition to cleaning wipe of about 3.75:1. The results of the test are illustrated in Table 2.

TABLE 2

Biguanide Bactericidal Wipe Effective of Salts on Biguanide Compound Released (Biguanide Compound level =0.3%)

% Salt	% Biguanide Compound Release with NH_4Cl (Dexter 8589)
0	35.9
0.1	42.7
0.3	46
0.4	59.1
0.5	62
0.6	68
0.7	77
0.8	88
0.9	92

As illustrated in Tables 1 and 2, the quat and biguanide compound retention on the cleaning wipe is about 50% and 64% respectively when the biocide release agent was not included in the

CLX-13261

Dexter ZA (0.79% K Citrate)	100

The test results in Table 3 reveal that an increase in quat release from the cleaning wipe occurred regardless of the type of wood pulp containing cleaning wipe. Similar results were observed from cleaning compositions containing biguanide compounds. In addition, the test results confirmed that increased biocide release agent concentrations in the improved cleaning composition resulted in decreased quat and biguanide compound retention on the wipe.

Another set of tests were conducted to determine if there was any affect on the amount of quat or biguanide compound release as a function of the amount of quat or biguanide compound in the improved cleaning composition. The results of these tests are illustrated in Table 4. The cationic biocide used in the improved cleaning composition illustrated in Table 4 was BARQUAT 4250Z by Lonza. The improved cleaning composition included about 0.3 weight percent amine oxide, about 1 weight percent potassium citrate, about 0.1 weight percent sodium EDTA, about 4.9 weight percent isopropanol, and the balance water. The cleaning wipe was DuPont 8838 having a loading ratio of improved cleaning composition to cleaning wipe of about 3.75:1.

TABLE 4
Effect of different quat levels on quat released (K citrate = 1.0%)

% Quat in Improved cleaning composition	% K-citrate = 1.0%
0	N/A
0.507	100%
0.101	99.6%
0.203	95.8%
0.279	94.2%
0.367	95.2%

The results in Table 4 indicate that the amount of quat compound released from the cleaning wipe is not adversely affected by the amount of quat in the improved cleaning composition. Similar results were observed from cleaning compositions containing biguanide compounds.

Several tests were also conducted to determine whether the biocide release agent in the cleaning agent adversely affected the bactericidal efficacy of the improved cleaning composition

CLX-13261

Clorox B		Clorox Q	
Vantocil P	0.3%	Bardac 4250	0.37%
APG	0.5%	Barlox 12	0.29%
Isopropanol	2.6%	Isopropanol	4.8%
PnB	1%	DiNa EDTA	0.1%
Ammonium Chloride	0.1%	Potassium Citrate	0.1%
Fragrance	0.15%	Fragrance	0.15%
Water	Balance	Water	Balance
DuPont 8838	21.05%	DuPont 8838	21.05%
Loading ratio	3.75:1	Loading ratio	3.75:1

As illustrated in Table 5, both Clorox formulas exhibit excellent micro efficacy properties. The micro efficacy properties where as good as or better than the tested commercially available products.

Tests were also conducted to determine the cleaning effectiveness of the improved cleaning composition. Two different sets of data were collected for determining the cleaning effectiveness of the improved cleaning composition, namely filming and streaking data, and soil removal data. Two different Clorox formulations were used when testing the soil removal effectiveness of the formulations, and three Clorox formulations were used when testing the filming and streaking properties of the formulations. These formulations were also successfully used on a variety of absorbent and/or adsorbent materials (e.g. wipes, mop heads, sponges, towels, etc.). Clorox Q and Q1 are quat containing formulations. Clorox B is a biguanide compound containing formulation. In each test, the Clorox formulations were compared to Mr. Clean and Lysol cleaners. The test results of these data sets are shown in Tables 6 and 7.

TABLE 6
SOIL REMOVAL DATA

Formula	Sanders & Lambert	Bathroom Soil	Kitchen Grease
Clorox Q	2306.7	56	551.6
Clorox B	2391.3	120	692.5
Mr. Clean	2615	314.5	607.2
Lysol	1845.4	27.9	527.4

Sanders & Lambert (Industry based soil)
Bathroom Soil (Industry based soil ASTM D5343-93)
Kitchen Grease (Industry CSMA Based soil DCC-12)

of a quat with a polyglucoside, lower alcohol and PnB was also tested in Clorox Q1, but did not yield a F&S score that was nearly as low as the biguanide compound formulation of Clorox B. The general formulation for Clorox Q1 is set forth as follows:

Clorox Q1

BarQuat 205M	0.15 - 0.3%
APG	0.4 - 0.6%
Isopropanol	2 - 3%
PnB	0.8 - 1.2%
Ammonium Chloride	0.1 - 0.5%
Fragrance	0.1 - 0.2%
Water	Balance
DuPont 8838	20 - 22.2%
Loading ratio	3.5 - 4:1

Another set of tests were conducted to ascertain the dermal irritancy of the improved cleaning compositions. Three Clorox formations were used. These formulations were also successfully used on a variety of absorbent and/or adsorbent materials (e.g. wipes, mop heads, sponges, towels, etc.). Clorox Q and Q2 include about 0.2 weight percent quat and Clorox B included about 0.3 weight percent biguanide compound. The general formulation for Clorox Q2' and the specific formulation of Clorox Q2 are set forth as follows:

Clorox Q2'

BarQuat 205M	0.15 - 0.3%
Surfonic L108	0.3 - 0.5%
Zonyl FSO	0.01 - 0.5%
Isopropanol	2 - 3.5%
PnB	0.8 - 1.4%
DiK EDTA	0.06 - 1.5%
Ammonium Chloride	0.08 - 0.5%
Fragrance	0.1 - 0.2%
Water	Balance
DuPont 8838	20 - 22.2%
Loading ratio	3.5 - 4:1

Clorox Q2

BarQuat 205M	0.2%
Surfonic L108	0.35%
Zonyl FSO	0.04%
Isopropanol	2.6%
PnB	1%
DiK EDTA	0.1%
Ammonium Chloride	0.1%
Fragrance	0.15%
Water	Balance
DuPont 8838	21.05%
Loading ratio	3.75:1

The results of these tests are tabulated in Table 8 and illustrated in FIGURE 3.

Dowanol PnP (Dow Chemical) - propyleneglycol-propylether
Gafquat 440 (ISP Corp.) - copolymer of vinylpyrrolidone and dimethylaminoethyl methacrylate quaternized with diethylsulfate.
Zonyl FSO (DuPont) – fluorochemical
Barquat 205M (Lonza) – alkyldimethylbenzylammonium chloride
Vantocil P (Avecia) - poly(hexamethylene biguanide) hydrochloride
***Higher scores mean better cleaning**

The results of the Sanders & Lambert test reveal that the addition of Gafquat 440 to the improved cleaning composition significantly improved the cleaning performance of the improved cleaning composition. Further testing revealed a noticeable detergency performance increase in the improved cleaning composition when the improved cleaning composition included at least about 0.02 weight percent Gafquat. Gafquat contents as high as 10 weight percent also produced improved the cleaning performance of the improved cleaning composition. Concentrations that exceeded about 10 weight percent resulted in increased filming and streaking of the improved cleaning composition. Testing also revealed that the combination of Gafquat and APG resulted in improved detergency. APG, a surfactant, provided detergency to the improved cleaning composition without the inclusion of the Gafquat. However, the detergency of the improved cleaning composition was significantly enhanced when Gafquat was added in combination with APG to the improved cleaning composition. Similar improvements in detergency were also realized by the inclusion of other polymers in the improved cleaning composition. Several of these polymers are identified in Tables 10 and 11. Generally, the weight percent of APG in the improved cleaning composition is about 0.02 - 5%.

Additional tests were conducted to compare the use of various types of polymers in combination with detergency surfactants such as APG. These formulations were also successfully used on a variety of absorbent and/or adsorbent materials (e.g. wipes, mop heads, sponges, towels, etc.). The test results are set forth in Table 10.

TABLE 10
VARIOUS POLYMER ADDITIONS

Clorox Composition	G	H	I	J	K	L	M
Glucopon 325	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Isopropanol	2.00	2.00	2.00	2.00	2.00	2.00	2.00

CLX-13261

TABLE 11
MORE POLYMER ADDITIONS

Clorox Composition	N	O	P	Q	R	S	T	U	V
Glucopon 325	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Isopropanol	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
Dowanol PnP	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Vantocil P	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Ammonium chloride	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Defoamer	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Fragrance	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Airvol 24-203	1.00								
Aquamere H-1212		1.00							
Cyanamer –100L			1.00						
Diaformer Z-712				1.00			0.50	1.00	1.50
PVP-K90					1.00				
Syntran HX52-1-1						1.00			
Balance water									

Glucopon 325 (Cognis) -alkylpolyglucoside
Dowanol PnP (Dow Chemical) - propyleneglycol–propylether
Vantocil P (Avecia) - poly(hexamethylene biguanide) hydrochloride
Airvol 24-203 (Air Products) - polyvinylalcohol
Aquamere H-1212 (Hydromer) - PVP/Polyurethane
Cyanamer N-100L (Cytec Industries) - polyacrylamide
Diaformer Z-712 (Clariant) - methacryloylethyl—oxide/methacrylates copolymer
PVP-K90 (VWR Scientific) - polyvinylpyrrolidone
Syntran HX52-1-1 (Interpolymer) - quaternary acrylic copolymer

The test results from Table 11 reveal that various types of polymers can be effectively used in the improved cleaning composition without adversely affecting the biocidal efficacy of the improved cleaning composition. The formulations in Table 11 also resulted in an improved cleaning composition that had improved detergency and/or reduced filming and streaking.

The improved cleaning composition can include a variety of surfactants and/or builders. Several formulations which incorporate the use of a few of these surfactants and/or builders are set forth in Table 12.

TABLE 12
VARIOUS SURFACTANTS /BUILDERS

Clorox Composition	W	X	Y	Z	A1
Glucopon 325	0.02				

CLX-13261

Dowanol PM				0.50		
Dowanol PnP		0.50				
Dowanol DPnB					0.50	0.50
Dowanol DB			0.50	0.50		
Gafquat 440	0.20	0.20	0.20	0.20	0.20	0.20
Vantocil P	0.10	0.10	0.10	0.10	0.10	0.10
Balance water						
Relative Performance on Sanders & Lambert	1	1	4	2	4	3

Glucopon 325 (Cognis) -alkylpolyglucoside
Dowanol PM (Dow Chemical) - propyleneglycol methylether
Dowanol PnP (Dow Chemical) - propyleneglycol n-propylether
Dowanol DPnB (Dow Chemical) - dipropyleneglycol n-butylether
Dowanol DB (Dow Chemical) - diethyleneglycol butylether
Gafquat 440 (ISP Corp.) - copolymer of vinylpyrrolidone and dimethylaminoethyl methacrylate quaternized with diethylsulfate.
Vantocil P (Avecia) - poly(hexamethylene biguanide) hydrochloride
***Performance – 1 indicates best performance and 4 indicates worst performance.**

The formulations of the improved cleaning composition set forth Table 13 illustrate the improved cleaning performance of the improved cleaning composition when a dual boiling point solvent system is included in the improved cleaning composition. The formulations set forth in Table 14 illustrate the reduced filming and streaking of the improved cleaning composition when a dual boiling point solvent system is included in the improved cleaning composition.

TABLE 14
DUAL SOLVENT FILMING/STREAKING PERFORMANCE

Composition	H1	I1	J1	K1	L1	Lemon Scent Lysol Disinfectant All Purpose Cleaner	Citrus Scent Lysol Disinfectant Antibacterial Kitchen Cleaner
Glucopon 325	1.50	1.50	1.50	1.50	1.50		
Isopropanol	0.50	0.50		1.00			
Dowanol PM			0.50				
Dowanol PnP	0.50	0.50					
Dowanol DB			0.50		0.50		
Gafquat 440	0.20	0	0.20	0.20	0.20		
Vantocil P	0.10	0.10	0.10	0.10	0.10		

include:

(I) cationic biocide; and,

(ii) surfactant and/or biocide release agent.

The cationic biocide, surfactant, and/or biocide release agent used in the improved cleaning composition can be the same or similar compounds used in the improved cleaning composition for hard surfaces. The cationic biocide (e.g., biguanide compound, quat, etc.) in the improved cleaning composition is used at least in part to enhance the disinfecting, sanitizing, and/or sterilizing attributes of the improved cleaning composition. The biocide release agent in the improved cleaning composition is used at least in part to reduce or prevent the retention of the cationic biocide on an absorbent and/or adsorbent surface.

The improved cleaning composition can also include buffering and pH adjusting agents, fragrances or perfumes, waxes, dyes and/or colorants, solubilizing materials, stabilizers, thickeners, defoamers, hydrotropes, lotions and/or mineral oils, enzymes, bleaching agents, cloud point modifiers, preservatives, ion exchangers, alkalies, anticorrosion materials, antiredeposition materials, optical brighteners, chelating agents, enzymes, whiteners, brighteners, antistatic agents, sudsing control agents, hydrotropes, bleach precursors, soil removal agents, anti-dye transfer agents, soil release agents, softening agents, opacifiers, inert diluents, graying inhibitors, stabilizers, and/or polymers.

A one general formulation of the improved cleaning composition in weight percent is as follows:

Cationic Biocide	0.02 - 20%
Biocide Release Agent	0.025 - 90%
Water	less than about 99.95%

wherein the ionic strength of the biocide release agent is at least about 5×10^{-3} mol/l.

Another general formulation of the improved cleaning composition in weight percent is as follows:

Cationic Biocide	0.02 - 20%
Surfactant	0.05 - 99%

CLX-13261

EXAMPLE 36

Biocide	0.1 - 2%
Biocide release agent	0.08 - 3%
Builder/solvent/ Surfactant	0.015 - 35%
Water	at least 60%

wherein the ionic strength of the biocide release agent is at least about 1×10^{-2} mol/l.

EXAMPLE 37

Biocide	0.04 - 2%
Biocide release agent	0.05 - 2.5%
Builder/solvent/ Surfactant	0.05 - 17%
Water	at least 78.5%

wherein the ionic strength of the biocide release agent is at least about 1×10^{-2} mol/l.

EXAMPLE 38

Biocide	0.15 - 0.8%
Biocide release agent	0.1 - 2.5%
Builder/solvent/ Surfactant	0.085 - 12.8%
Water	at least 80%

wherein the ionic strength of the biocide release agent is about 2×10^{-2} - 1 mol/l.

EXAMPLE 39

Biocide	0.1 - 2%
Biocide release agent	0.1 - 2%
Builder/solvent/ Surfactant	0.2 - 10%

Builder /solvent/ Surfactant/biocide release agent	0 - 99%
Water	0 - 99.95%

EXAMPLE 44

Biocide	0.05 - 5%
Builder/solvent/ Surfactant/biocide release agent	0.001 - 75%
Water	at least 10%

EXAMPLE 45

Biocide	0.02 - 5%
Builder/solvent/ Surfactant/biocide release agent	0 - 27%
Water	at least 60%

EXAMPLE 46

Biocide	0.1 - 2%
Builder/solvent/ Surfactant/biocide release agent	0.015 - 35%
Water	at least 60%

EXAMPLE 47

Biocide	0.04 - 2%
Builder/solvent/ Surfactant/biocide release agent	0.05 - 17%
Water	at least 78.5%

EXAMPLE 48

BARQUAT 4250Z	0.3 - 0.4%

CLX-13261

Water	at least 90%

wherein the ionic strength of the salts in the improved cleaning composition is about 3.75×10^{-2} - 5.4×10^{-2} mol/l.

EXAMPLE 51

Vantocil P	0.15 - 0.5%
Isopropanol	0.1 - 4%
PnB (glycol ether)	0.5 - 1.5%
Surfactant	0 - 1.5%
Ammonium Chloride	0.05 - 1%
Dipotassium EDTA	0 - 0.3%
Fragrance	0 - 1%
Water	at least 90%

wherein the ionic strength of the salts in the improved cleaning composition is about 3.75×10^{-2} - 5.4×10^{-2} mol/l.

EXAMPLE 52

BTC 2250	0.05 - 0.4%
Vantocil P	0.05 - 0.4%
Sodium Citrate	0.2 - 2%
DiPotassium EDTA	0 - 0.5%
PnB (glycol ether)	0 - 2%
Surfactant	0 - 2%
Isopropanol	0 - 5%
Lauryl Dimethyl Amine Oxide	0 - 1%
Water	at least 90%

wherein the ionic strength of the salts in the improved cleaning composition is about 3.75×10^{-2} -

CLX-13261

We claim:

1. An improved cleaning composition comprising a cationic biocide, surfactant, and a polymer, said cationic biocide including a compound selected from the group consisting of biguanide compound, quaternary ammonium compound, and mixtures thereof.

2. The improved cleaning composition as defined in claim 1, wherein said surfactant includes a non-ionic surfactant.

3. The improved cleaning composition as defined in claim 1, wherein said surfactant includes a glycoside.

4. The improved cleaning composition as defined in claim 1, wherein said polymer is formulated to enhance the detergency of said surfactant.

5. The improved cleaning composition as defined in claim 1, wherein said polymer includes a compound selected from the group consisting of vinylpyrrolidone homo- and copolymers, acrylamide homo- and copolymers, polyvinylalcohol and polyvinylacetate homo- and copolymers, quaternary acrylate and methacrylate copolymers, amphoteric acrylate and methacrylate homo- and copolymers, and mixtures thereof.

6. The improved cleaning composition as defined in claim 5, wherein said polymer includes a compound selected from the group consisting of polyvinylpyrrolidone compound, quaternary acrylic copolymer, and mixtures thereof.

7. The improved cleaning composition as defined in claim 6, wherein said polyvinylpyrrolidone compound includes a copolymer of vinylpyrrolidone and dimethylaminoethylmethacrylate quaternized with diethylsulfate.

17. The improved cleaning composition as defined in claim 1, wherein said second surfactant includes a compound that increases the wetting properties of said improved cleaning composition.

18. The improved cleaning composition as defined in claim 16, wherein said second surfactant includes a fluorosurfactant.

19. An improved cleaning composition comprising a cationic biocide, and a biocide release agent, said cationic biocide including a compound selected from the group consisting of biguanide compound, quaternary ammonium compound, and mixtures thereof, said biocide release agent having an ionic strength in said improved cleaning composition of at least about 5×10^{-3} mol/l.

20. The improved cleaning composition as defined in claim 19, further including a surfactant.

21. The improved cleaning composition as defined in claim 20, wherein said surfactant includes a non-ionic surfactant.

22. The improved cleaning composition as defined in claim 21, wherein said surfactant includes a glycoside.

23. The improved cleaning composition as defined in claim 22, wherein said glycoside includes alkyl polyglycosides.

24. The improved cleaning composition as defined in claim 20, further including a polymer.

25. The improved cleaning composition as defined in claim 24, wherein said polymer is

effective amount of builder.

34. The improved cleaning composition as defined in claim 20, further including at least an effective amount of a second surfactant.

35. The improved cleaning composition as defined in claim 34, wherein said second surfactant includes a compound that increases the wetting properties of said improved cleaning composition.

36. The improved cleaning composition as defined in claim 34, wherein said second surfactant includes a fluorosurfactant.

37. An improved cleaning composition comprising a cationic biocide, and a dual boiling point solvent system, one of said solvent compounds having a boiling point of less than about 150°C and another solvent compound having a boiling point of at least about 150°C, said cationic biocide including a compound selected from the group consisting of biguanide compound, quaternary ammonium compound, and mixtures thereof.

38. The improved cleaning composition as defined in claim 37, further including a biocide release agent, said biocide release agent having an ionic strength in said improved cleaning composition of at least about 5×10^{-3} mol/l.

39. The improved cleaning composition as defined in claim 37, further including a surfactant.

40. The improved cleaning composition as defined in claim 39, wherein said surfactant includes a non-ionic surfactant.

49. The improved cleaning composition as defined in claim 47, wherein said cationic biocide further includes a quaternary ammonium compound.

50. The improved cleaning composition as defined in claim 37, further including at least an effective amount of builder.

51. The improved cleaning composition as defined in claim 39, further including at least an effective amount of a second surfactant.

52. The improved cleaning composition as defined in claim 51, wherein said second surfactant includes a compound that increases the wetting properties of said improved cleaning composition.

53. The improved cleaning composition as defined in claim 51, wherein said second surfactant includes a fluorosurfactant.

54. A cleaning material having reduced biocide retention comprising:

a. an absorbent or adsorbent material including a material selected from the group consisting of wood pulp, wood pulp derivative, synthetic fibers, and mixtures thereof; and

b. an improved cleaning composition at least partially absorbed or adsorbed on said absorbent or adsorbent material, said improved cleaning composition including cationic biocide, surfactant, and a biocide release agent, said cationic biocide including a compound selected from the group consisting of biguanide compound, quaternary ammonium compound, and mixtures thereof.

55. The cleaning material as defined in claim 54, wherein said absorbent or adsorbent material is selected from the group consisting of a cleaning wipe, a cleaning pad, a mop head, and combinations thereof.

65. The cleaning material as defined in claim 64, further including a dual boiling point solvent system, one of said solvent compounds having a boiling point of less than about 150°C and another solvent compound having a boiling point of at least about 150°C.

66. The cleaning material as defined in claim 54, further including at least an effective amount of builder.

67. The cleaning material as defined in claim 54, further including at least an effective amount of a second surfactant.

68. The improved cleaning composition as defined in claim 67, wherein said second surfactant includes a compound that increases the wetting properties of said improved cleaning composition.

69. The improved cleaning composition as defined in claim 67, wherein said second surfactant includes a fluorosurfactant.

70. A cleaning material having reduced biocide retention comprising:

a. an absorbent or adsorbent material including a material selected from the group consisting of wood pulp, wood pulp derivative, synthetic fibers, and mixtures thereof; and

b. an improved cleaning composition at least partially absorbed or adsorbed on said absorbent or adsorbent material, said improved cleaning composition including cationic biocide and surfactant, said cationic biocide including a compound selected from the group consisting of biguanide compound, quaternary ammonium compound, and mixtures thereof.

71. The cleaning material as defined in claim 70, wherein said absorbent or adsorbent material is selected from the group consisting of a cleaning wipe, a cleaning pad, a mop head, and combinations thereof.

80. The cleaning material as defined in claim 70, further including a solvent system.

81. The cleaning material as defined in claim 80, further including a dual boiling point solvent system, one of said solvent compounds having a boiling point of less than about 150°C and another solvent compound having a boiling point of at least about 150°C.

82. The cleaning material as defined in claim 70, further including at least an effective amount of builder.

83. The cleaning material as defined in claim 70, further including at least an effective amount of a second surfactant.

84. The improved cleaning composition as defined in claim 83, wherein said second surfactant includes a compound that increases the wetting properties of said improved cleaning composition.

85. The improved cleaning composition as defined in claim 84, wherein said second surfactant includes a fluorosurfactant.

86. A method for cleaning a hard surface comprising:

a. providing an absorbent or adsorbent material, said absorbent or adsorbent material including a material selected from the group consisting of wood pulp, wood pulp derivative, synthetic fibers, and mixtures thereof;

b. at least partially exposing said absorbent or adsorbent material with an improved cleaning composition, said improved cleaning composition including a cationic biocide, surfactant, and biocide release agent, said cationic biocide including a compound selected from the group consisting of biguanide compound, quaternary ammonium compound and mixtures thereof, and;

and mixtures thereof.

94. The method as defined in claim 86, further including a solvent.

95. The method as defined in claims 94, wherein said improved cleaning composition includes a dual boiling point solvent solution, one of said solvent compounds having a boiling point of less than about 150°C and another solvent compound has a boiling point of at least about 150°C.

96. The method as defined in claims 86, wherein said improved cleaning composition further includes at least an effective amount of a second surfactant.

97. The method as defined in claim 96, wherein said second surfactant includes a compound that increases the wetting properties of said improved cleaning composition.

98. The method as defined in claim 97, wherein said second surfactant includes a fluorosurfactant.

99. A method for cleaning a hard surface comprising:

a. providing an absorbent or adsorbent material, said absorbent or adsorbent material including a material selected from the group consisting of wood pulp, wood pulp derivative, synthetic fibers, and mixtures thereof;

b. at least partially exposing said absorbent or adsorbent material with an improved cleaning composition, said improved cleaning composition including a cationic biocide, and surfactant, said cationic biocide including a compound selected from the group consisting of biguanide compound, quaternary ammonium compound and mixtures thereof, and;

c. contacting said hard surface with said absorbent or adsorbent material and said improved cleaning composition.

108. The method as defined in claims 107, wherein said improved cleaning composition includes a dual boiling point solvent solution, one of said solvent compounds having a boiling point of less than about 150°C and another solvent compound has a boiling point of at least about 150°C.

109. The method as defined in claims 99, wherein said improved cleaning composition further includes at least an effective amount of a second surfactant.

110. The method as defined in claim 109, wherein said second surfactant includes a compound that increases the wetting properties of said improved cleaning composition.

111. The method as defined in claim 110, wherein said second surfactant includes a fluorosurfactant.

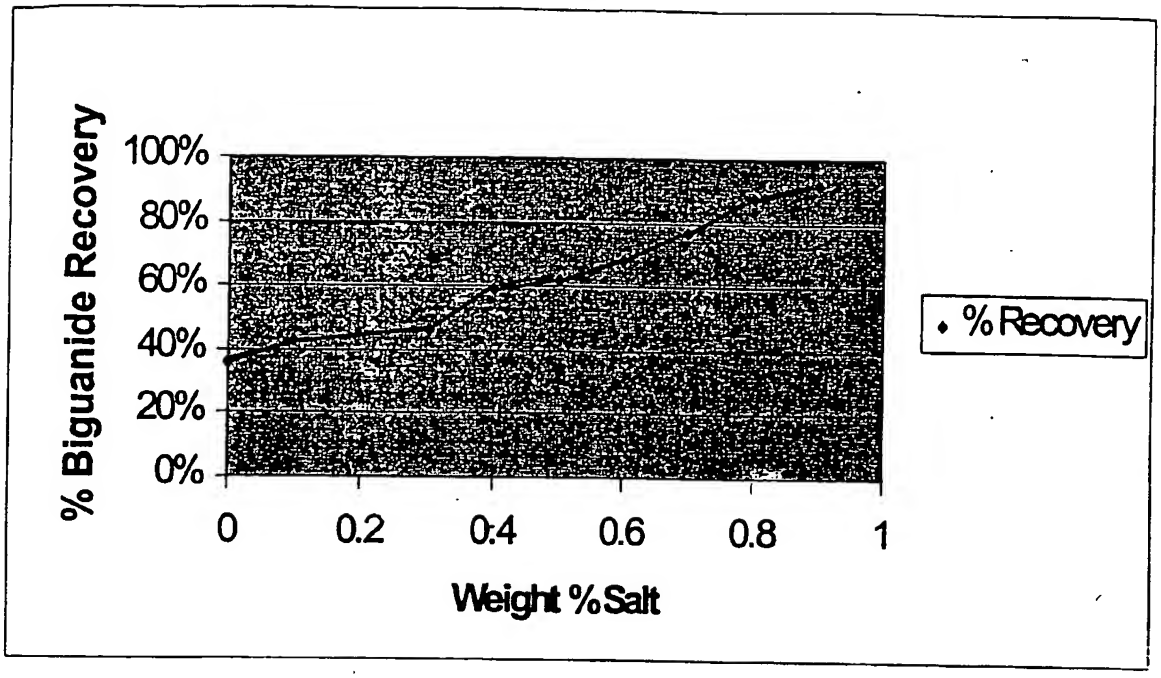

% Biguanide Recovery
100%
80%
60%
40%
20%
0%
0
0.2
0.4
0.6
0.8
1
Weight % Salt
% Recovery

FIGURE 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/27032

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C11D 1/62, 1/66, 1/835, 3/37, 17/00
US CL : 510/295, 384, 391, 423, 433, 434, 500, 501, 504

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 510/295, 384, 391, 423, 433, 434, 500, 501, 504

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
None

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
None

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO01/23510 A2(THE PROCTER & GAMBLE COMPANY) 05 April 2001 (05.04.2001), See Abstract; page 6, line 30 to page 8, line 35; see page 10, line 15 to page 11, line 25; page 13, line 10 to page 14, line 5; page 23, lines 10-35.	1-35, 37-52, 54-68, 70-84, 86-97, 99-110
X	WO01/23511 A1(THE PROCTER & GAMBLE COMPANY) 05 April 2001 (05.04.01), See Abstract; page 4, line 3 to pge 6, line 30; page 7, line 21 to page 18, line 15; page 26, line 20 to page 28, line 20.	1-4, 8-25, 28-44, 47-57, 61-73, 76-91, 94-104, 107-111
X	US 6,083,517 A (ANANTHAPADMANABHAN et al) 04 July 2000, See Abstract; col. 3, line 10 to col. 6, line 55.	1-4, 8-13, 16, 17, 19-25, 28-31, 34, 35

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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08 November 2002 (08.11.2002)

Date of mailing of the international search report
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Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231
Facsimile No. (703)305-3230

Authorized officer
Yogendra Gupta

Telephone No. (703) 308-0661

Form PCT/ISA/210 (second sheet) (July 1998)